

Feasibility Study of a novel Chest Drain Insertion Device in a Porcine Model of Pneumothorax

Arik Eisenkraft^{1,2}, Linn Wagnert-Avraham¹, Lilach Gavish¹, S. David Gertz¹, Iris Milner¹, Ruth Shaylor³, David Kushnir⁴, Asaf Kedar⁴, Yoav Mintz⁴

¹Institute for Research in Military Medicine IRMM, Faculty of Medicine, The Hebrew University of Jerusalem; ²IDF Medical Corps; ³The Department of Anesthesiology, Hadassah Medical Center, Jerusalem; ⁴Center for Innovative Surgery, Hadassah Medical Center, Jerusalem

Background

Chest trauma comprises 20-25% of deaths from trauma, sometimes mandating the insertion of a chest tube, with complication rates of chest tube insertion reaching 25%.

C-Lant is a novel chest tube insertion device including integrated fixation capability, intended for both pre-hospital and hospital use by operators with minimal experience.

The aim of the study was to test the prototype in a large animal model of pneumothorax.

Results

The insertion of the device was simple and effective. There were no detectable negative physiological effects following insertion. Both air and liquid were promptly drained out of the chest cavity. During the study, technical changes were made to improve the fixation of the device to the chest wall and permit insertion of catheters with a variety of diameters.



Methods

Four white domestic female pigs were included. Eighteen units of the device were tested. Pneumothorax, tension pneumothorax, and hemothorax were induced followed by the insertion of the C-Lant device to decompress the thorax. Animals were continuously monitored for respiratory and hemodynamic parameters. C-Lant devices were assessed more than 30 times in different tests. Assessments included effects on the integrity of adjacent tissues.

Conclusions

We have successfully tested the C-Lant device in four pigs, studying the performance of 18 units with catheters of varying diameters. The device seems as a promising tool for insertion of chest tubes by minimally experienced medical providers in the pre-hospital environment, and in the hospital setting as well.



האוניברסיטה
העברית
בירושלים
THE HEBREW
UNIVERSITY
OF JERUSALEM